System Specification

Record and Retrieval Phase I Thread, Thor DP1

Checkout and Launch Control System (CLCS)

84K00302-030

Record and Retrieval Phase 1

Thread

Thor DP1

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Version 2.0

Record and Retrieval Phase 1
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Introduction

Record and Retrieval Phase 1 Overview.

This thread establishes the frame work for CLCS data recording, archival and retrieval services, and begins the migration of the recording function from the CCMS PDR/SPA and CDS/Shuttle Data Center to the CLCS.

Record and Retrieval Phase 1 Concept

The Record and Retrieve Services Phase 1 Thread provides the capability to record RTPS change data and message data in the Data Recording and Distribution (DRD) subsystem of the Shuttle Data Center (SDC). It also provides retrieval services in the form of SDC Retrieval APIs.

The following diagram depicts the relationship between the SDC-DRD, RTPS and the applications using the DRD as a data source. The shaded areas indicate new equipment for this thread. The horizontal hatches indicate where applications may run requesting retrieved data. The diagonal hatches indicate the areas modified in this thread.

Record and Retrieval Phase 1 Specification

Statement of Work

- Investigate and define what data are recorded in CLCS. Including system messages, commands, data distribution, and inter application communication.

- Investigate and define where and when data are recorded.

- Investigate and define long range plan for data retrieval.

- Provide Index recording of FD data in the CLCS format on the Shuttle Data Center system.

- Provide Index retrieval service to return FD data in a format usable by Data Analysis and Presentation programs.

- Provide initial capability to retrieve CLCS FD's and provide the addition health and time information.

- Provide initial capability to retrieve for a CLCS FD's the Reason Code information for FD's with health bits set

- Provide the capability to record all CLCS supported commands.

- Provide the capability to retrieve all CLCS supported commands.

- Provide the capability to filter retrieval of CLCS supported commands by source, destination, type, and time.

- Provide the capability to record all CLCS supported System Messages.

- *Provide the capability to retrieve all CLCS supported System Messages.*

- *Provide the capability to filter retrieval of CLCS supported System Messages by source, destination, type, and time.*

- Provide the capability to record all CLCS packets.

- Provide the capability to retrieve all CLCS packets.

- Provide the capability to filter retrieve of CLCS supported packets by source, destination, type, and time.

Add to SOW

Investigate and design the HW/SW interface between RTPS and SDC for recording RTPS Data.

Investigate and define the interface for RTPS Command and Control Workstations and CCP to request and receive Retrieved Data from SDC.

<Moved items dealing with raw packet retrieval application to the Support Advisory Thread >

Requirements

<u>SLS Requirements</u>

This section contains a list of SLS and high level derived requirements that are driving the design of the capability of the THOR release.

2.4.6 Recording Requirements
2.4.6.1 The SDC shall record data for all RTPS Test Sets.
2.4.6.2 The SDC shall record all data sent by any RTPS Test Set for recording..
2.4.6.7 The SDC shall provide the capability to record and catalog RTPS processed data.
2.4.6.8 The SDC shall provide the capability to record, catalog, and index RTPS measurement and command data.
2.4.7 Retrieving Requirements
2.4.7.2 The SDC shall provide the capability to retrieve recorded Measurement FD data in raw and formatted formats, including interpreted ASCII data, where applicable.
2.4.7.3 The SDC shall provide a set of programs to retrieve each different kind of data sent from a RTPS set in raw and formatted formats, including interpreted ASCII data, where applicable.
2.4.7.4 The SDC shall provide the capability to retrieve LDB and GSE data in raw and formatted formats, including interpreted ASCII data, where applicable.
2.4.7.5 The SDC shall provide the capability to retrieve, correlate, index, analyze, and format processed data.
2.4.7.7 The SDC shall provide a capability to export data to users.
2.4.8 Archiving Requirements
2.4.8.1 Recorded data in the SDC shall be managed hierarchically.
The three levels shall be On-line, Near-line, and Off-line.
On-line data shall reside on system attached magnetic disk (or media of equivalent access speed).
Near-line data shall reside on optical or magnetic media accessible by an on-line robot.
Off-line data may require manual effort to be retrievable.
Migration of data among levels shall be managed by algorithms taking into account age, usage, criticality, and arbitrary assignment.
2.4.8.2 The SDC shall provide online storage for raw data for all current Shuttle Processing Flows.
2.4.8.4 The SDC shall provide online storage for command and measurement data for all terminal counts, engine hot firings and special tests, as identified.
2.4.8.5 The SDC shall provide off-line storage for all recorded data.
2.4.8.6 The SDC shall provide the capability to restore off-line data.

Derived Requirements

Data Recording Port requirements:
- RTPS Side
1. The DRP shall be a new RTPS subsystem in each control group.
2. *The DRP shall provide redundancy for data recording.*
3. The DRP shall participate in standard Reliable Messaging and System Integrity.
4. The complete packet, including RM header shall be passed in the data stream for recording.
5. For each activity, the DRP shall produce a merged, time-stamped recording data stream containing all packets, in the order received.
6. A selectable packet filtering capability, based on CLCS packet type, log bit, or flow control/handshaking, shall be provided.
7. *Recording System health function shall periodically poll the SDC for assigned test Recording status.*
8. *Recording System health function shall communicate SDC recording status to Subsystem Integrity.*
- SDC Side
9. The DRP shall buffer the data stream in memory to accommodate bursts in data volume.
10. The DRP shall immediately transmit the output stream to the SDC, with error recovery.
11. The DRP shall also temporarily store the data stream on disk, and in the event the communication path or the recording process in SDC is temporarily interrupted, forward the stored data stream to SDC-DRD when the communication path or recording process is restored.

SDC-DCN Interface for requesting and receiving Retrieved Data from the SDC Router and Firewall Requirements:
1. The security and integrity of the DCN connection shall be assured.
2. *Redundancy for requesting and receiving retrieved data shall be provided.*
3. All connections shall be originated only on the RTPS side.
4. Only point-to-point traffic destined between RTPS and SDC shall be passed.
5. All Multicast traffic shall be blocked to SDC.

Record and Retrieval Phase 1 Hardware Diagram

The new Data Recording Ports (DRP) and SDC-DCN Interfaces along with the required switching capability are shown by the shaded blocks in the hardware diagram below.

A redundant pair of Data Recording Ports is required for each control group or remote set. Switching capability is required to associate the redundant pair in any test set with any redundant pair of Indexers in SDC/DRD which have been assigned to support the test.
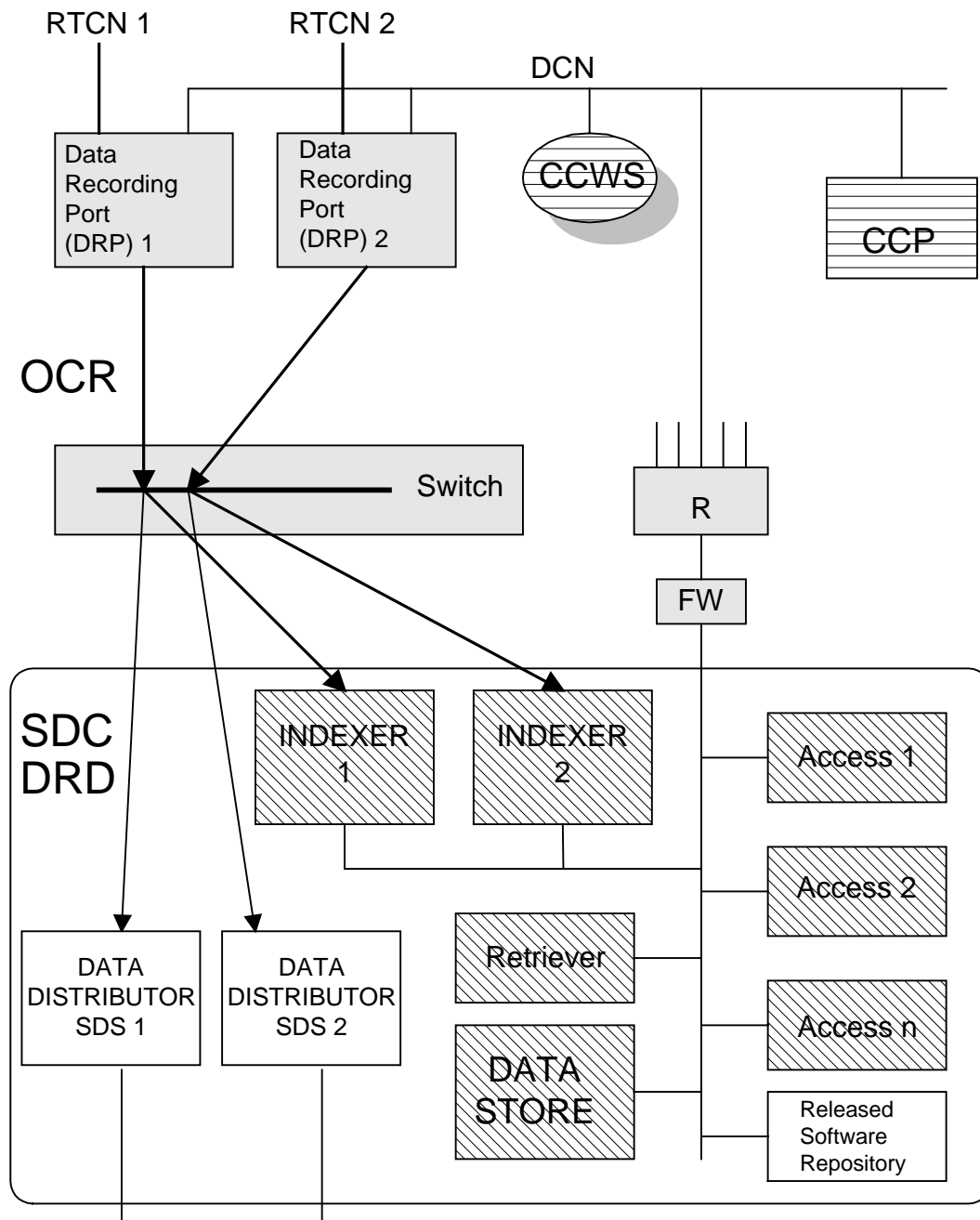
Data Recording Port (DRP)

The following diagram depicts the function and organization of the DRP.

Data Recording Port (DRP)
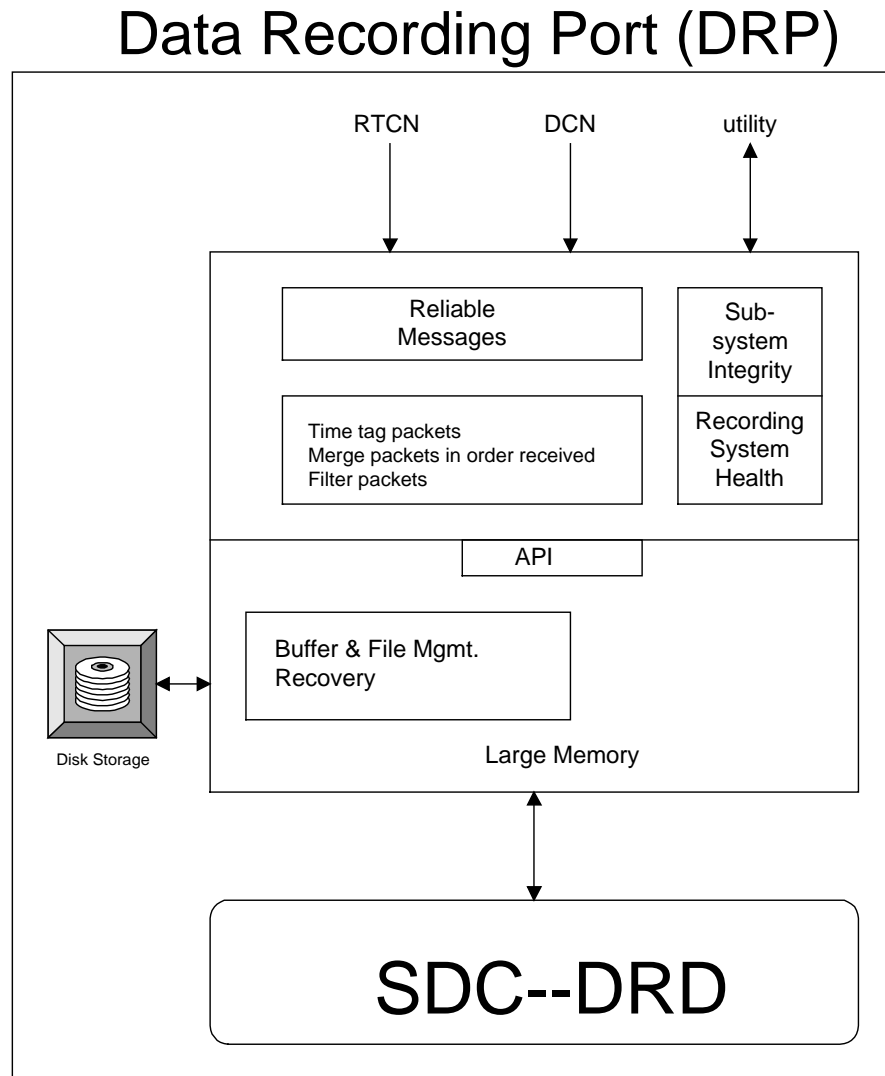
Record and Retrieval Phase 1 Deliverables

Software   Record, Archive and Retrieval CSCI

Deliverable	R&D Document	Code	API Manual	Users Guide
Record, Archive and Retrieval	X	X	X	X
DRP	X	X	X	X

Hardware   DRP HWCI (Prototype):

Deliverable	R&D Document	Drawings	Prototype	Users Guide
HWCI Name	X	X	X	

Hardware   SDC-DCN I/F HWCI (Prototype):

Deliverable	R&D Document	Drawings	Prototype	Users Guide
HWCI Name	X	X	X	

Hardware   NW Equipment HWCI:

Deliverable	R&D Document	Drawings	Prototype	Users Guide
HWCI Name	X	X	X	

Other Deliverables:

Engineering Report to present the results of the following investigations:

1. What data is recorded in SDC.
2. Where and when data is recorded.
3. Define long range plan for data retrieval.
4. Design for HW/SW I/F between RTPS and SDC for recording.
5. Define I/F for CCWS and CCP to request and receive Retrieved Data.

Record and Retrieval Phase 1 Assessment Summary

Labor Assessments

No.	CSCI/HWCI Name	Thor LM	Changes covered in
1	Record, Archive and Retrieval CSCI	30.0	RAR/ Data Distribution
2	Reliable Messages	TBD	
3	DRP HWCI	1.0	
4	SDC-DCN I/F HWCI	1.0	
5	NW Equipment Installation	1.0	
	TOTAL	33+ LM	

Hardware Costs

Item number	Name	Unit Cost	Qty.	Total	Assumptions
1	DRP	20,000	1/26	$20,000/520,000	Prototype/New Buy
2	SDC-DCN I/F	50,000	1/2	$50,000/100,000	Prototype/New Buy
3	NW Equipment	100,000	1	$100,000	New Buy
		Total:		**$70,000/720,000**	

Record and Retrieval Phase 1 Procurement

TBD

Procurement Activity	Completion Date
Define DRP Requirements	
Submit Purchase Request to Procurement	
Award Contract	
Receive DRPs	
Define SDC-DCN I/F Requirements	
Submit Purchase Request to Procurement	
Award Contract	
Receive SDC-DCN I/F	

Record and Retrieval Phase 1 Schedule & Dependencies

Schedule

Task Name	Start	Finish
Thor Assessment Kickoff	7/23/97	7/23/97
Concept Panel Internal Review		10/15/97
Concept Panel		10/17/97
Thor Development		
Requirement Panel Internal Review		10/22/97
Requirement Panel		10/24/97
Design Panel Internal Review		10/29/97
Design Panel		10/31/97
CSCI Unit Testing	12/1/97	2/10/98
CSCI Development Integration Test	2/10/98	2/17/98
CSCI Formal Integration Test	2/17/98	2/23/98
Support System Integration Test	2/23/98	3/27/98
Thor Development Complete		3/27/98

Note: Schedule for Recording, Archive and Retrieval CSCI only, other CSCI and HWCI not yet complete.

Dependencies

None.

Record and Retrieval Phase 1 Simulation Requirements

None.

Record and Retrieval Phase 1 Integration and System Test

In Work

Record and Retrieval Phase 1 Training Requirements

Training Needed

None.

Training to be provided

None

Record and Retrieval Phase 1 Facilities Requirements

None.

Travel Requirements

None

Record and Retrieval Phase 1 Action Items/Resolution

None